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IN THE U.S. PATENT AND TRADEMARK OFFICE

April 3, 2001

Applicant(s) : Toshiaki MOTONAGA et al.

For : HALFTONE PHASE SHIFTING PHOTOMASK AND
BLANKS FOR HALFTONE PHASE SHIFTING
PHOTOMASK THEREFOR AND A METHOD FOR FORMING
PATTERN BY USING THE HALFTONE PHASE
SHIFTING PHOTOMASK

Atty. Docket No.: OPS Case 529

Assistant Commissioner for Patents
Washington, DC 20231

AMENDMENT BEFORE FIRST OFFICE ACTION

Sir:

Prior to issuance of the first Office Action in the
above-identified application, kindly enter the following:

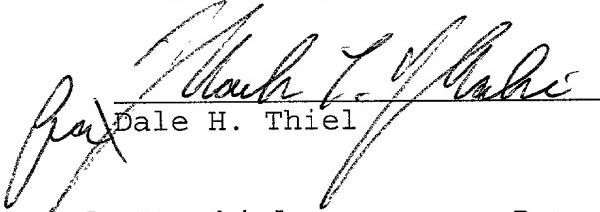
IN THE SPECIFICATION

Paragraphs 0029, 0030, 0035, 0036 and 0038-0040 are
amended as indicated in the attached marked-up copy. Pursuant
to 37 CFR §1.121, replacement pages with the amended
paragraphs are attached.

REMARKS

The above amendment is being made to conform the brief
descriptions of Figs. 1, 2, 5, 7, 8 and 10-12 to the drawing
sheets.

Respectfully submitted,


 Dale H. Thiel

DHT/jp

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Encl: Marked-up paragraphs 0029, 0030, 0035, 0036
and 0038-0040 (2 pages)
Replacement paragraphs 0029, 0030, 0035, 0036
and 0038-0040 (2 pages)

112.9803

[0029] ~~Fig. 1 is a view~~
Figs. 1(a), 1(b), 1(c) and 1(d)
are views for showing the principle of halftone phase shifting lithography.

[0030] ~~Fig. 2 is a view~~
Figs. 2(a), 2(b), 2(c) and 2(d)
are views for showing conventional lithography against Fig. 1.

[0033] ~~Fig. 5 is a view~~
Figs. 5(a) and 5(b) are views for showing a state in which phase difference and transmittance are changed by applying excimer laser to a halftone phase shifting photomask having the halftone phase shifting film containing chromium and fluorine.

[0035] ~~Fig. 7 is a view~~
Figs. 7(a) and 7(b) are views for showing that the spectrum analyzed from reflectance of X-rays (of after Fourier transform) is changed by applying excimer laser to a halftone phase shifting photomask having the halftone phase shifting film containing chromium and fluorine, in which Fig. 7(a) shows the spectrum analyzed from reflectance of X-rays of before the applying of excimer laser to the halftone phase shifting photomask, and Fig. 7(b) shows the spectrum analyzed from reflectance of X-rays of after the applying of excimer laser to the halftone phase shifting photomask.

[0036] ~~Fig. 8 is a view~~
Figs. 8(a), 8(b), 8(c), 8(d) and 8(e) are views for illustrating the processes in which blanks for halftone phase shifting photomask are produced and then a halftone phase shifting photomask of example 1 is obtained by processing the blanks for halftone phase shifting photomask.

[0038] ~~Fig. 10 is a view~~
Figs. 10(a), 10(b), 10(c) and 10(d) are views for illustrating the process for producing a halftone phase shifting photomask of Example 2.

[0039] ~~Fig. 11 is a view~~
Figs. 11(a) and 11(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 1.

[0040] ~~Fig. 12 is a view~~
Figs. 12(a) and 12(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 4.

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[0029] Figs. 1(a), 1(b), 1(c) and 1(d) are views for showing the principle of halftone phase shifting lithography.

[0030] Figs. 2(a), 2(b), 2(c) and 2(d) are views for showing conventional lithography against Fig. 1.

[0033] Figs. 5(a) and 5(b) are views for showing a state in which phase difference and transmittance are changed by applying excimer laser to a halftone phase shifting photomask having the halftone phase shifting film containing chromium and fluorine.

[0035] Figs. 7(a) and 7(b) are views for showing that the spectrum analyzed from reflectance of X-rays (of after Fourier transform) is changed by applying excimer laser to a halftone phase shifting photomask having the halftone phase shifting film containing chromium and fluorine, in which Fig. 7(a) shows the spectrum analyzed from reflectance of x-rays of before the applying of excimer laser to the halftone phase shifting photomask, and Fig. 7(b) shows the spectrum analyzed from reflectance of X-rays of after the applying of excimer laser to the halftone phase shifting photomask.

[0036] Figs. 8(a), 8(b), 8(c) 8(d) and 8(e) are views for illustrating the processes in which blanks for halftone phase shifting photomask are produced and then a halftone phase shifting photomask of example 1 is obtained by processing the blanks for halftone phase shifting photomask.

[0038] Figs. 10(a), 10(b), 10(c) and 10(d) are views for illustrating the process for producing a halftone phase shifting photomask of Example 2.

[0039] Figs. 11(a) and 11(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 1.

[0040] Figs. 12(a) and 12(b) are views for showing the phase difference change and the transmittance change due to applying excimer laser to a halftone phase shifting photomask having halftone phase shifting film of Example 4.